MOUNT FOR STAGE APPARATUS

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RELATED APPLICATION INFORMATION

[0002] This application claims the benefit of U.S. Provisional Application No. 60/420,896 filed October 23, 2002, which is incorporated herein by reference.

[0003] This application claims the benefit of U.S. Provisional Application No. 60/420,983 filed October 23, 2002, which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field Of The Invention

[0004] The invention relates to devices that support stage apparatus.

Description Of Related Art

[0005] Movies and television shows are an undeniable part of popular culture. To maintain a supply of movies and television shows for the public, many movies and television shows are made each year. At the heart of a movie or television show are images. To capture images that meet the often strict requirements of producers, directors and cinematographers, proper lighting may be used on the contents of a scene, whether the scene is of actors, animals, a set, and others. To achieve desirable images, lights of various kinds, grip equipment and other apparatus are set up to obtain an appropriate lighting effect.

DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1A is a front elevational view of a mount for stage apparatus according to the invention.

[0007] FIG. 1B is a side elevational exploded view of the components of a mount for stage apparatus.

[0008] FIG. 1C is a cross sectional view of the collar of a bolt used in a mount for stage apparatus.

[0009] FIG. 2A is a top plan view of a support rail according to the invention.

[0010] FIG. 2B is an end view of a support rail according to the invention

[0011] FIG. 3A is a side view of a mount for stage apparatus is aligned in a channel in a support rail according to the invention.

[0012] FIG. 3B is a side view of a mount for stage apparatus placed in a support rail according to the invention.

[0013] FIG. 3C is a side view of a mount for stage apparatus secured to a support rail according to the invention.

[0014] FIG. 4 is a side view of a lamp attached to a support mount for stage apparatus that is secured to a support rail which is attached to a wall according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0015] Throughout this description, the embodiments and examples shown should be considered as exemplars, rather than limitations on the apparatus and methods of the invention.

Mount

[0016] FIG. 1A is a top plan view of a mount for stage apparatus according to the invention, and FIG. 1B is an exploded view of the components of a mount for stage apparatus. The support mount 100 includes a base plate 110, at least one knob assemblies 120, and a mount device 150. The support mount 100 may also include a friction plate 112.

[0017] The mount device 150 allows for the attachment of lighting equipment, grip equipment and other stage apparatus, including, for example, fresnel lamps, open faced lamps, scoop lamps, soft boxes, combination lighting equipment, flags, nets, filters, screens, reflectors and others. The mount device 150 is configured so as to receive connections from a junior mount, a senior mount or other mount included with the lighting, grip and other stage equipment.

[0018] The mount device may include a handle 152 and a tube 154. The handle 152 may be made of an easily graspable material such as plastic, resin, rubber or metal. The handle 152 may be screwed into the tube 154 to attach lighting equipment and other stage apparatus. The mount device 150 may be permanently attached to the base plate 110 by a bolt, by welding, and by other securing techniques. The mount device 150 may be included in a

single mold, may be a single extrusion, may be a single machined component or may be made according to another manufacturing technique such that the mount device 150 incorporates the base plate 110 and the mount device 150.

[0019] Although shown as being a cylinder with a handle, mount device 150 may be one of various devices used to attach lighting equipment and other stage apparatus. The mount device 150 may be a cylindrical pin, may be a bent or angled pin, may be a hook, and may have other configuration suitable for attaching lighting equipment and other stage apparatus. The mount device 150 may be a solid or hollow tube or cylinder that is hexagonal, circular, square, or other shape. The mount device 150 may or may not include a handle. The mount device 150 may be or include a junior mount, a junior pin, a senior mount, a senior pin, a bail pin, a 45-degree baby pin, and others that are well known or proprietary in the entertainment industry.

[0020] The base plate 110 may be constructed of a strong durable material such as metals, including aluminum, as well as plastics and resins. The base plate 110 may be of a size sufficient to accommodate and support lighting equipment and other apparatus that are coupled to the mount device 150. Various sizes of base plate 210 may be used to support varying sized mount devices 150 which in turn support lighting equipment and other stage apparatus. In one embodiment, the base plate 110 is a rectangle that is approximately four inches by three inches. The base plate 110 may be other sizes, such as, for example, square, oval, hexagonal, and irregular. The base plate may have one dimension that generally corresponds to the width of the rail 200, described below.

[0021] The base plate 110 may have two or more holes 116 of sufficient size to accommodate the knob assembly 120. The holes 116 may have a diameter slightly larger than the diameter of the cylindrical portion 136 of t-bolt 132 described below. In one embodiment, the diameter of holes 116 is 0.3125 inch.

[0022] The base plate 110 may have two or more holes 118 of sufficient size to allow for the rivet attachment of friction plate 112. In one embodiment, the diameter of holes 118 is 0.1875 inches. In some embodiments, the holes 118 may be unnecessary.

[0023] The friction plate 112 may be coupled to the base plate 110 via rivets or other fastening device, including, for example, bolts. The rivets, bolts or other fastening device may attach the friction plate 112 to the base plate 110 through holes 118. In place of or in addition to the rivets or other fastening means, the friction plate 112 may be attached to the base plate 110 by glue or other adhering substance. The friction plate 112 may be made of nylon, plastics, resins including polyvinyl chloride (PVC), or other material that will reduce wear or deterioration of the rail 200. A single two sided plate that replaces the base plate 110 and the friction plate 112 may also be used, such that a first side is a metal, and the second side is a nylon, plastic, Teflon or other material.

[0024] The knob assemblies 120 may include a knob 122 to which a stem 124 is coupled. The stem 124 may be a hexagonal nut, as shown in Figs 1A and 1B, or may be a column, including, for example, square, round, and others. In one embodiment, the stem 124 includes internal threads on one end and external threads for mounting the knob 122 on the other end, as shown in Fig. 1B. In another embodiment, the stem 124 includes internal threads on both

ends. In this embodiment, on one end, a bolt is used to permanently secure the knob 122 to the stem 124. In other embodiments, the knob 122 is attached to the stem 124 using other techniques, including glue, a rivet, a weld, and others. The knob 122 and the stem 124 may be a single component derived from a mold, extruded, machine made, and others.

[0025] A t-bolt 130 having a washer 126 included thereon is placed into the knob 122/stem 124 combination. The t-bolt 130 comprises a head 132, a collar 134 and a cylindrical portion 136. The head 132 is generally flat on its sides and is generally perpendicular to the center axis of the cylindrical portion 136. The head 132 is aligned so as to form a "T" shape with the cylindrical portion 136. The head 132 may have a length 146 and a width 148. The cylindrical portion 136 employs a technique to fasten the t-bolt 130 to the stem 124 of the knob assembly 120. The technique may be complementary screw threads such as male screw threads. The complementary, corresponding, and coordinated techniques securely attach the cylindrical portion 136 with the stem 124. Other techniques may include a spring loaded piston or pin, an expanding piston or pin that enlarges to meet and attach within receiving cavity 116, butterfly bolts, and other bolts, stems, pins and pistons that expand, extrude or otherwise fill and couple with the stem 124.

[0026] FIG. 1C is a cross sectional view of the collar 134 of a bolt 130 used in a mount for stage apparatus. The collar 134 is located at the juncture of the head 132 and the cylindrical portion 136. The collar 134 may be shaped so as to serve as a cam when attaching the support mount 100 to and removing the support mount 100 from a rail 200, as described below. The shape of the cam of the collar 134 is irregular. The shape of the cam may be

such that the width 162 of the cam at the side and end of the head 132 of the t-bolt 130 are approximately equal to the diameter of the cylindrical portion 136. However, at its longest point, at a diagonal, the length 164 of the cam collar 134 is greater than the diameter of the cylindrical portion 136. Described another way, the width 162 of the cam at the side and end of the head 132 are equal to the width 148 of the head 132, while the length 164 of the cam of the collar 134 at its longest point is a size between the length 146 of the head 132 and width 148 of the head 132, and may be between 10 and 15 percent bigger than the width 148.

[0027] The t-bolt 130 may be zinc plated steel or other strong durable metal, and may also be constructed from sufficiently strong and durable plastics, resins, and other materials. A sufficiently strong t-bolt 130 is a t-bolt that is able to accommodate the forces exerted on and through the t-bolt 130 when lighting and other stage equipment are coupled to the support mount 100 while the t-bolt secures the support mount 100 to a rail 200.

[0028] The washers 126 may be used to assist in the securing of the support mount 100 to the support rail. The washers 126 may be a durable and strong material such as metals including aluminum, steel, and others, and may also be plastics, resins, and others. The diameter of the whole in the washers 126 may be of sufficient size so as to allow the cylindrical portion 136 of t-bolt 130 to pass through. The diameter of the hole in the washer 126 may also be smaller than the diameter of the stem 124. The external diameter of the washers 126 may be larger than the diameter of the stem 124.

[0029] In one embodiment, for example, the washer 126 has an external diameter of 0.75 inch, an internal diameter of 0.375 inch, and is 0.03125 inch thick; the t-bolt 130 is

approximately one inch long; the cylindrical portion 136 has a diameter of approximately 0.25 inch diameter and may be 0.5625 inch long; the collar 134 may be 0.125 inch long, and has varying width to achieve its cam functionality, with the width at its greatest point being approximately 0.375 inch; and the head 132 has a length 146 of approximately 0.1875 inch, and has a width 148 of 0.6875 inch, and has a height of approximately 0.3125 inch.

[0030] The components of the support mount 100 may vary depending on the size of the base plate 110 and/or the application. The sizes of all the components of support mount 100 may be increased or decreased depending on a particular application or use.

Support Rail

[0031] FIG. 2A is a top plan view of a rail 200 according to the invention, and FIG. 2B is an end view of the rail 200. The rail 200 includes two channels 210 into which support mount 100 and other mountable devices may be secured according to the methods described herein. The rail may have one or more holes 214 through which screws, bolts, nails and other fastening devices may be placed to attach the rail 200 to a wall or other structure. The holes 214 may be regularly spaced at intervals to provide for sufficiently secure fastening to a wall or other structure. The holes 214 may be spaced so as to correspond with the typical placement of studs, beams or other structure within a wall, including, for example, walls used in film, movie and theater sets.

[0032] As shown in Fig. 2B, the channels 210 may be generally "T" shaped or mushroom shaped. Other shaped channels may also be used, such as, for example, without limitation,

"J", "C", "U" and "L" shaped channels. When other shaped channels are used, the t-bolt 130 may be replaced with bolts, pistons, stems, pins and other components that have either other shaped heads that are coordinated with the shape of the channel 210, or are expandable, extrudable or otherwise fill the space of the channel 210 to secure the support mount 100 to the rail 200.

[0033] The rail 200 includes lips 212 adjacent to each side of the opening of the channel 210, such that each channel 210 has two lips 212. The size and shape of the channels 210 generally correspond to the proportions of the t-bolt 130 described above. The shape and size of the interior portion of the channel 210 corresponds to the size and shape of the head 132 of t-bolt 130. That is, the width 234 of the channel 210 is of a size sufficient to accommodate the length 146 of the head 132 of the t-bolt 130. The width 232 of the opening in channels 210 between lips 212 generally corresponds to the width 148 of the head 132 of the t-bolt 130 (which is approximately the same as the diameter of the cylindrical portion 138 of t-bolt 130). In addition, the thickness of the lips 212 may correspond to the height of the cam collars 134.

[0034] The rail 200 may be constructed from a strong, durable, lightweight material including metals such as aluminum, as well as plastics and resins. The rail 200 may include hollow areas 222 and/or cut-out or vacant areas 224. Areas 222 and 224 may reduce the weight of the rail 200, and may reduce the amount of material from which the rail 200 is formed, thus, reducing the cost of manufacture of the rail 200.

[0035] The rail 200 may be a useful length, and may depend on a particular application or use. When used in stage sets, for example, the rail 200 may be a convenient length, such as 2, 4, 6 and 8 feet.

[0036] In one example implementation, the rail 200 is approximately 3 inches wide and about 0.625 inch high; the width of the opening of the channels 210 is approximately 0.3125 inch, and the channels 210 are approximately 0.8125 inch wide at their widest point; and the height of the channels 210 between the lips 212 and the bottom of the channel 210 at its highest point is approximately 0.3125 inch.

[0037] Although depicted as having two channels, 210, the rail 200 may have a single channel or may have more than two channels.

Mount and Rail

[0038] FIG. 3A is a side view of the support mount 100 for stage apparatus aligned in the opening in the channel 210 in the rail 200. The support mount 100 may be placed into the channel 210 by aligning the heads 132 of t-bolt 130 of knob assemblies 120 with the opening of the channel 210 between the lips 212. The support mount 100 is pushed down into the channel 210 so that the heads 132 of t-bolts 130 are placed into the channels 210 between the lips 212. If a friction plate 112 is used and is coupled to the base plate 110 with rivets or bolts, the rivets or bolts may be attached in a line with the holes 116 for the t-bolts 130. As such, the rivets or bolts may assist with the positioning of the support mount 100 into the channels 210 of the rail 200. The knobs 122 are then rotated to screw the t-bolt 130 into the

knob assemblies 120. This allows a user to quickly easily attach the support mount 100 to the rail 200. The rotating may be achieved by hand. The rotating may be started by hand and finished with a tool such as, for example, a pliers or wrench.

[0039] In other embodiments, the knob assembly may be otherwise engaged to quickly easily attach the support mount 100 to the rail 200. The engaging may be achieved by pushing or pressing the knob 122 or performing another action with the knob 122 of the knob assembly 120 to activate the complementary technique employed to secure the t-bolts 130 into the stem 124 of the knob assembly 120. The pushing, pressing or otherwise engaging the knob assembly 120 may cause a bolt, pin or piston to extend, into, expand or otherwise fill the channel 210 to secure the support mount 100 to the rail 200.

[0040] FIG. 3B is a side view of the support mount 100 for stage apparatus placed into the rail 200 with the head 132 of bolt 130 orthogonal to the channel 210, and Fig. 3C is a side view showing the support mount 100 secured onto the rail 200. While initially turning the knob 122 clockwise, the cam portion of the collar 134 of the t-bolt 130, by virtue of its shape, automatically aligns the head 132 of the t-bolt 130 generally perpendicularly to the channel 210. As the cam portion of the collar 134 contacts the inner edge of lips 212 of the rail 200 the head 132 is aligned in the channel 210. By rotating the knob 122, the t-bolt 130 is screwed into the stem 124. More specifically, by rotating the knob 122 clockwise, the male threads of the cylindrical portion 136 of the t-bolt 130 are drawn by the corresponding female threads of the stem 124 into the stem 124. This causes the underside of the head 132 of the t-bolt 130 to contact the underside of the lips 212.

[0041] As the knob assembly 120 is tightened, the head 132 of the t-bolt 130 "grabs" the underside of the lips 212. Friction results from this "grabbing." The friction is important in that it helps in forming the attachment of the support mount 100 with the rail 200. The friction may be enhanced by the use of a ribbed, rough, textured or other pattern on the underside of the head 132.

[0042] As the knob 122 is tightened, the washer 126 is pulled flush to the top of the base plate 110, and the base pate 110 is pulled tightly flush to the rail 200. The pressure of the base plate 110 against the rail 200 in conjunction with the pressure of the underside of the head 132 of the t-bolt 130 against the lips 212 causes the mount 200 to be securely attached to the rail 200.

[0043] To further tighten the attachment of the support mount 100 with the rail 200, a wrench, pliers or other tool may be used to rotate or otherwise engage the knob 122.

[0044] This procedure is followed for each of the knob assemblies 120 included in the support mount 100. In this way the support mount 100 may be quickly easily securely attached to the rail 200.

[0045] FIG. 4 is a side view of a lamp 300 attached to a support mount 100 for stage apparatus that is secured to a support rail 200 which is attached to a wall 400. After the rail 200 is secured to a wall of a stage set by screws, nails or other fastening devices through holes 214, the support mount 100 may be quickly easily securely attached to the rail 200. A light or other stage apparatus may then be secured to the mount device 150 of support mount

100. The base plate 118 when in contact with and secured to the rail 200 either directly or through friction plate 112, distributes much of the force of holding a piece of stage equipment from the support mount 100 to the rail 200.

[0046] To quickly easily release and remove the support mount 100 from the rail 200, the knobs 122 may be rotated counter-clockwise. The rotating may be achieved by hand. In one embodiment, rotating the knob 122, causes the threads on the cylindrical portion 136 of the t-bolt 130 to recede from the stem 124. As the knob 122 is rotated counter-clockwise, the t-bolt 130 rotates until the cams on the collar 134 abut the internal edges of the lips 212 of the channel 210. The cams of the collar 134 align the t-bolt 130 such that the head 132 of the t-bolt is in line with, that is, is parallel with, the opening between the lips 212. In this way, the support mount 100 may be quickly and easily removed from the rail 200.

[0047] In another embodiment, the knob assemblies 120 may be replaced by stem assemblies which include a stem 124 and a t-bolt 130. The stem 124 may be tightened by hand, and may be further secured by using a tool such as a pliers or wrench. The stem 124 of the stem assemblies may be hexagonal or square or other shape to easily accommodate a wrench or pliers. The stem 124 may also be a cylinder with at least two wide grooves or flat portions on opposite sides of the stem. In this way, a cylindrical stem may accommodate securing tools such as pliers and wrenches.

[0048] In other embodiments, the t-bolt 130 is replaced with a carriage bolt or other bolt having a circular, square, hexagonal, or other shaped head. The head of the carriage bolt may be of a size that may be slid into the channel 210 of rail 200. In these embodiments, the

support mount may be slid onto the end of the rail 200, as the shaped head of the carriage bolt is too large to be inserted into the channel opening between the lips 212.

[0049] Although exemplary embodiments of the present invention have been shown and described, it will be apparent to those having ordinary skill in the art that a number of changes, modifications, or alterations to the invention as described herein may be made, none of which depart from the spirit of the present invention. All such changes, modifications and alterations should therefore be seen as within the scope of the invention.